UTILITY SERVICE co., inc

P. O Box 1354 • Perry, GA 31069

Office (478) 987-0303 FAX (478) 987- 2991
Watts: (800) 223-3695

Web Site: www.utilityservice.com

VKF 250,000 Gallon Elevated Water Storage Tank Inspection Report

Arnold Air Force Base / AEDC

Tullahoma, Tennessee

May 10, 2002

TENNESSEE DIVISION OF WATER SUPPLY
REGULATION 1200-5-1.17(33)

(33) All public water systems shall properly maintain their distribution system finished water storage tanks. Each community water system shall establish and maintain a maintenance file on each of its finished water and distribution storage tanks. The maintenance files must be available for inspection by the Department's personnel. These files must include the dates and results of all routine water storage tank inspections by system personnel, any reports of detailed "professional" inspections of the water storage tanks by contractor personnel, dates and details of routine tank cleanings and surface flushings, and dates and details of all maintenance activities. The tank inspection records shall include dates of the inspections; the sanitary, coating, and structural conditions of the tank; and all recommendations for needed maintenance activities. Community water systems shall have a "professional" inspection performed and a written report produced on each of their finished water and distribution storage tanks at least once every five years. Non-community water systems shall have a "professional" inspection and written report performed on each of their atmospheric pressure finished water and distribution storage tanks not less frequently than every five years. Records of these inspections shall be available to the Department personnel for inspection.

Table of Contents

General Information

Notice

The condition of the tank, protective coatings and accessories was determined based upon the information, data and samples observed and/or collected by the inspector using practical means to safely access various areas of the tank structure. The conclusions of this report are the opinion of the inspector; derived from information obtained in accordance with generally acceptable industry standards and practices. These conclusions are based solely on the conditions present as of the date of inspection and are subject to change.

Introduction

On May 10, 2002, the 250,000 gallon VKF Elevated tank was inspected by Utility Service co., inc. The purpose of the inspection was to evaluate the exterior coatings, interior coatings, structural conditions, sanitary conditions and safety related issues. Prior to the actual inspection procedure the interior of the tank was pressure washed to remove all mud, silt and sediment. After the inspection procedure, the tank was spray disinfected, the man ways were sealed and the tank was made ready for continued service.

Tank Site

The tank is located inside the gated compound at Arnold Air Force Base near Tullahoma, Tennessee. The immediate area surrounding the tank is not fenced. However, access is limited and controlled with authorized entry through a manned security gate.

There is ample room at the site for equipment during renovation work on the tank.

The area around the tank is properly graded to allow excess moisture to drain away from the foundation piers.

Several buildings and parking lots are located near the tank site. There are no high power lines in close proximity to the tank.

Tank Details

CAPACITY:	250,000 gallon	**INSPECTION DATE:**	May 10, 2002
DESIGN:	Elevated Ovaloid	**INSPECTOR:**	Greg Brooks
CONSTRUCTION STYLE:	Welded Steel	**INTERIOR COATING:**	Epoxy
CONSTRUCTION DATE:	Unknown	**INTERIOR LEAD PRESENCE:**	160 ppm (See attached lab test)
BUILDER:	Unknown	**EXTERIOR COATING:**	Alkyd Enamel
HEIGHT/DIMENSION:	130' HWL	**EXTERIOR LEAD PRESENCE:**	<100 ppm (See attached lab test)
RISER STYLE:	Wet	**NUMBER/SUPPORT COLUMNS:**	Eight
RISER/ SIZE-LENGTH:	100'H x 36" D	**SUPPORT COLUMN STYLE:**	Tubular 24" Diameter

Exterior Conditions

Support Columns, Structure, Riser and Bowl

The protective coating in this area of the tank is in generally fair condition with scattered rust spots noted. There were several areas of spot coating failure that has allowed surface corrosion to develop.

The tower access ladder is in good condition and is equipped with an OSHA approved notched tube type safety fall prevention system. The ladder does NOT have a locking ladder gate.

Entry of the ladder to the balcony floor is of poor design. The passage is narrow and restrictive, making it hazardous to workers climbing the structure. The balcony floor has an opening 20" x 22" for access to the balcony area. Safety chains should be installed on both sides of this opening for workers safety.

An 6" diameter external overflow pipe is attached to one of the columns. The overflow terminates in a concrete storm drain.

The riser is equipped with a 24" bolted manway and an 18" boiler type manway.

Tank Shell, Balcony and Railing

The protective coating in this area of the tank is in fair condition, but is nearing the end of its useful service life. Random coating failure has allowed surface corrosion to develop on the support structure, balcony and railing. The balcony floor has several areas that hold water. The standing water has allowed corrosion and premature coating failure to occur.

The coating is becoming thin and chalky from exposure to UV and the elements.

The shell access ladder is in good condition and is equipped with an OSHA approved rigid notched tube fall prevention system.

Roof or Dome

The protective coating in this area of the tank was in fair to good condition. The coating is wearing thin with age and shows sign of failure with spot rust and delamination of the top coat from the primer. The red colored dome is faded and chalky to the touch.

The roof vent and screen is structurally sound with some flash and spot rust noted.

Coating Adhesion

The adhesion of the existing protective coating was evaluated in accordance with ASTM D 3359 "Standard Test Methods for Measuring Adhesion by Tape Test". These test methods are used to assess the adhesion of coating films to metallic substrates. The information obtained from these tests is useful for determining whether an existing paint system is a candidate for recoating or if complete removal should be performed. The tests are made by applying and removing pressure-sensitive tape over cuts made in the film. The amount of coating detached is then assessed and compared to the ASTM rating scale. A rating of 5 is excellent, 4 is very good, 3 is good, 2 is marginal, 1 is poor and 0 is very poor.

Adhesion tests indicate the adhesion to be marginal to poor over most of the surfaces making this tank a poor candidate for over coating.

Lead Testing

Lead is a toxic heavy metal that is frequently contained in industrial coatings applied to water storage tanks. The presence of Lead in paint may require strict OSHA workers protection and EPA containment, collection and disposal protocols be followed during renovation. The US Department of Housing and Urban Development (HUD) identifies a level of 0.5% lead by weight (5000 ppm) as a trigger for abatement. The Consumer Product Safety Act (CPSA) defines a paint as "lead bearing" if it contains 0.06% lead by weight (600 ppm).

During the inspection, exterior paint samples were taken. The paint samples were analyzed by an independent laboratory. The total lead content of the exterior coating was <100 ppm and is considered to be a "NON lead bearing paint".

Summary / Recommendations (Exterior)

The exterior coating is nearing the end of it's useful service life. At present, the exterior coating is in fair to good condition with minor coating failure and corrosion scattered randomly over the tank. Due to poor adhesion of the coatings, the tank will require complete removal of the old paint prior to re-painting.

A locking anti-climb ladder gate should be installed on the tower ladder to deter unwanted persons from climbing the tank.

Aircraft warning lights on the tank do not work. If needed, the lights should be restored to proper operation.

Column base flanges should be re-grouted and sealed to prevent further deterioration.

Interior Conditions

Bowl and Riser

Prior to the clean-out, the bowl of the tank was covered with a buildup of sediment and silt approximately 1" deep. The epoxy paint appears to be in fair condition with some scattered pitting, rust tubercles and active electrolysis noted. Random weld seam rust is visible in the bowl and riser. The deepest pits are approximately 1/8 inch in depth.

Several sections of the cathodic protection system had fallen to the floor of the tank and were removed by our service crew during the cleaning and inspection.

Mid and Upper Wall Area

The protective coating in this area exhibits appears to be in good condition. Minor weld seam rust is random and scattered.

The interior ladder is in good condition, and is equipped with an OSHA approved notched tube type fall protection system.

Roof and Area Above High Water Level

The roof support beams are rusting where gaps exist between beams and roof plates. Lap seams in the roof saucer plate are rusting.

The tank still has a spider assembly in place. The spider is rusting, but is still structurally sound.

Lead Testing

Lead is a toxic heavy metal that is frequently contained in industrial coatings applied to water storage tanks. The presence of Lead in paint may require strict OSHA workers protection and EPA containment, collection and disposal protocols be followed during renovation. The US Department of Housing and Urban Development (HUD) identifies a level of 0.5% lead by weight (5000 ppm) as a trigger for abatement. The Consumer Product Safety Act (CPSA) defines a paint as "lead bearing" if it contains 0.06% lead by weight (600 ppm).

Paint chip samples were taken and submitted to an independent laboratory for analysis. A copy of this report is attached herein. The report indicates the coating is "NON" lead containing, with less than 100 ppm lead content.

Summary / Recommendations (Interior)

The interior coating is doing a poor job of protecting the steel. The complete removal and replacement of the interior coating should be completed the near future, as the existing lining will become ineffective and corrosion will accelerate as more substrate is exposed. Some pitting and electrolysis is now occurring with steel loss notable.

Some repairs and/or patching may be necessary after the interior is abrasive cleaned.

The cathodic protection system should be properly maintained and regulated if left in the tank.

Safety, Sanitation and Structural

Safety

Ladder Fall Protection

The exterior tower ladder IS equipped with a rigid notched tube fall protection system compliant with current OSHA and AWWA standards for fall protection. The ladder passing from the tower to the balcony IS NOT equipped with a fall protection system. Due to the poor design of this ladder and entry to the balcony it is not possible to install a fall protection device on this ladder.

Ladder Gate

The access ladder is NOT secured by a locking ladder gate. Although not required by OSHA, AWWA or State mandates, it is a wise decision on the part of the tank OWNER to install this device on all tank ladders. This serves as a deterrent to discourage unauthorized persons from climbing the tank.

Balcony Railing

The balcony railing was 40" inches high, which is within OSHA's allowable range of 36" to 42".

Riser Grate / Handrail

The interior riser opening was equipped with a safety grate.

Sanitation

Roof Hatch

The tank is equipped with a locking AWWA sanitary hatch with rain drip curbing and overhang. The hatch was not locked at the time of this inspection. A new lock was installed by our service crew upon completion of this inspection service.

Roof Vent

The vent and screen were found to be in good structural condition.

Overflow

The discharge of the 6" overflow terminates in a concrete storm drain near the base of the tank.

Structural

Foundations

The foundations appear to be in good condition, with no cracking, spalling or settling noted. Some cracking and deterioration of the grout under the base columns was noted.

Anchor Bolts and Chairs

Appear to be in good condition.

Appendix A

SUMMARY

Tennessee Division of Water Supply
Regulation 1200-5-1.17(33)

SUMMARY
Tank Inspection
Tennessee Division of Water Supply
Regulation 1200-5-1.17(33)
INSPECTION COMPONENTS
(AS APPLICABLE)

1	**STRUCTURAL**		
	a.	Foundation:	Good condition. Level, graded to drain excess moisture away From the tank. Grassed and well kept.
	b.	Ringwall:	N/A
	c.	Erosion/Settling:	None noted.
	d.	Column Flanges:	Good condition.
	e.	Anchor Bolts:	Good condition.
	f.	Tower Members:	Good condition.
	g.	Riser Pipe:	36" Tubular welded wet riser. Good condition overall with minor metal loss randomly scattered along weld seams.
	h.	Tank Shell:	Good condition.
	i.	Exterior Ladders:	Good condition.
	j.	Safety Climbing Devices:	OSHA approved rigid notched tube on exterior tower, shell and roof. Same on interior.
	k.	Balcony:	Good condition overall, with water ponding in several low spots.
	l.	Railings:	Meets OSHA and AWWA guidelines. Good condition.
	m.	Roof:	Welded seam to saucer cap. Cap is skip welded and lapped. Good condition.
	n.	Vents:	Good condition.
	o.	Overflow Pipe:	Six inch diameter external, terminates in storm drain pit.
	p.	Interior Ladders:	Good condition.
	q.	Welds:	Overall good condition. Some scattered random rust and Minor metal loss.
	r.	Bolts:	Good condition.
	s.	Rivets :	N/A
	t.	Pins:	Good condition.
	u.	Level Indicator:	No level indicator.
	v.	Leaks:	None noted.

2.	**SANITARY/SAFETY**		
	a.	Fence:	Inside Military compound, access through manned Security gate.
	b.	Gate:	Manned security gate at base entrance.
	c.	Locks:	N/A
	d.	Overflow Screens & Flap:	Overflow terminates in concrete storm drain pit.
	e.	Vent Screens:	Good condition.
	f.	Access Hatch:	24" AWWA rain curb type.
	g.	Access Hatch Lock:	Hatch was not locked at the time of this inspection. A new lock was installed after the cleaning and inspection service was completed.
	h.	Evidence of Foreign Matter:	None noted.
	i.	Evidence of Vandalism or Trespassing:	None noted.
	j.	Sediments:	Light, 1" or less.
	k.	Silt Stop:	No silt stop.
3	**COATING**		
	a.	Interior Coating Condition:	Some scattered rust and pitting in bowl, scattered rust On sidewalls and weld seams, roof beams and lap seams Are rusting. Spider assembly is rusting.
	b.	Exterior Coating Condition:	Becoming thin and worn from exposure to UV and age. Chalky to the touch, primer visible over 25% of area. Some randomly scattered rust and mildew.
	c.	Uncoated Concrete Surfaces:	Good condition.

INSPECTED BY: _____ DATE: May 10, 2002

Greg Brooks

Appendix B

Inspection Photographs

Top Left: View of the exterior tank and structure from a distance.

Top Right: Section of the support column showing corrosion and thin coating.

Bottom Left: Structure and bowl of the tank shows thin coating and mildew.

Bottom Right: Concrete piers are all in good condition. Tank is properly grounded.

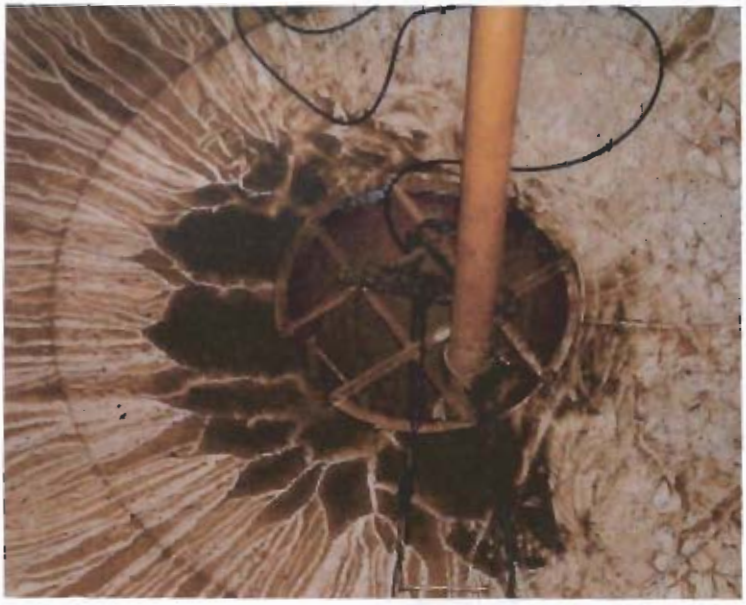
Top Left: View of the riser with one of the access plates open for Inspection.

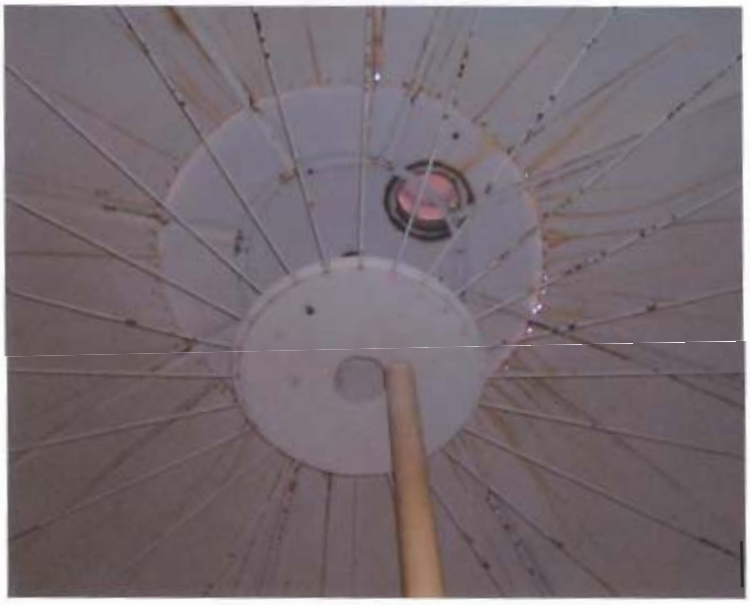
Top Right: Access ladder from structure to the balcony floor. This Opening should be protected by safety chains.

Bottom Left: Balcony floor and railing showing thin, worn coating.

Bottom Right: Central vent is rusting, aircraft warning light is disconnected. The coating is faded and chalked form exposure and age.

Top Left: Pitting from active electrolysis on the tank bowl.
Top Right: Rust and pitting in floor plates and weld seams.
Bottom Left: View of the riser from the tank bowl.
Bottom Right: Cathodic protection cables found on tank floor.





Top Left: Interior bowl at the riser showing riser safety grate in place. This photo was made prior to cleaning the sediment out.

Top Right: Eye level view of the spider assembly shows rusting.

Bottom Left: View of the spider assembly from the floor of the tank.

Bottom Right: Worker cleaning silt and sediment from the tank prior to the Inspection.

Appendix C

Lead Test Laboratory Results

LAW & COMPANY
Consulting and Analytical Chemists

3770 GREEN INDUSTRIAL WAY
CHAMBLEE, GA. 30341

PHONE: 770-216-2044
FAX: 770-216-2045

Chemical Report

05/21/02

Laboratory Number: 826351-352 Page: 1 of 1 Received: 05/14/02

Utility Services Co., Inc.
Attn: Regina Arthur
P.O. Box 1350
Perry, GA 31069

Description: 2 paint chips, Arnold AFB, Tullaltona, TN 05/10/02
Analysis requested by: Greg Brooks

Sample ID	Laboratory ID	Total Lead (Pb) (ppm)
0510021, Exterior Sidewall	826351	<100
0510022, Interior Bowl	826352	160

*****

Respectfully Submitted,
LAW & COMPANY

By: Thomas E. Lindsey

dh

Samples are retained for a period of thirty to sixty days after completion of testing. After that time, samples are disposed of in an environmentally sound manner unless other arrangements are made by the client.